

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Farassat, Dr. F.)	Group Art Unit Unknown
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Appl. No.	:	Unknown)	
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Filed	:	Herewith)	
)	
For	:	CIRCUIT HOUSING)	
)	
Examiner	:	Unknown)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to examination, please amend the above referenced application as follows:

IN THE SPECIFICATION:

Page 1, immediately after the title "CIRCUIT HOUSING", please delete "DESCRIPTION" and insert—Related Applications This application claims the benefit of the application 01 115 832.6 filed in the European Patent Office June 28, 2001. Background of the Invention Field of the Invention--.

Page 1, line 11, please amend the sentence to read The invention relates to a miniaturized circuit housing for encapsulating and providing external contacts for integrated circuits and, in particular, a housing with a housing floor and an oppositely disposed housing lid which presses a circuit contact element positioned therebetween resiliently against the upper surface of the housing floor.

Page 1, line 13, please insert —Description of the Related Art--.

Page 3, line 31, please insert —Summary of the Invention--.

Page 8, between lines 17 and 18, please insert —Brief Description of the Drawings--.

Page 9, between lines 22 and 23, please insert —Detailed Description of the Preferred Embodiments--.

IN THE CLAIMS:

Please cancel Claim 19 without prejudice.

Please amend the Claims as follows:

1. (Amended) A miniaturized circuit housing to encapsulate and provide external contacts for at least one integrated circuit having circuit contact elements on a lower surface, the circuit housing comprising:

a housing floor comprising a lower surface which includes housing contact elements for making external contact and an upper surface which is electrically connected to the circuit contact elements on the lower surface of the circuit; and

a housing lid opposite the housing floor so as to press the circuit with the circuit contact elements resiliently against the upper surface of the housing floor with no permanent connection between the materials thereof

2. (Amended) The circuit housing of Claim 1, wherein the housing lid on its lower surface, which faces the circuit, comprises at least one spring element that presses the circuit against the housing floor.

3. (Amended) The circuit housing of Claim 2, wherein the at least one spring element is fixedly attached to the lower surface of the housing lid.

4. (Amended) The circuit housing of Claim 2, wherein the at least one spring element is loosely inserted between the housing lid and circuit.

5. (Amended) The circuit housing of Claim 1, wherein the housing lid is flexible.

6. (Amended) The circuit housing of Claim 1, further comprising a wall that substantially rigidly connects the floor and the lid of the housing to one another at their circumference so as to define an interior of the housing and tightly seals off the interior of the housing.

7. (Amended) The circuit housing of Claim 6, wherein the wall is formed as part of the housing floor or the housing lid and wherein the wall is sealed via a butt joint to the respective housing lid or housing floor in a gas-tight manner.

8. (Amended) The circuit housing of Claim 7, wherein the seal is formed by an external plastic encapsulation of at least the butt joint between the housing lid or housing floor and the wall.

9. (Amended) The circuit housing of Claim 6, wherein the interior of the housing is filled with an inert gas.

10. (Amended) The circuit housing of Claim 1, wherein the housing has a flat four-cornered shape, with a substantially level and rectangular housing floor and housing lid.

11. (Amended) The circuit housing of Claim 6, wherein the lid of the housing is rigidly constructed and joined to the wall

12. (Amended) The circuit housing of Claim 1, wherein the lid of the housing is constructed as a heat sink comprising area-increasing structures in order to cool the circuit .

13. (Amended) The circuit housing of Claim 2, wherein the ductility and shapes of the housing lid and the at least one spring element is selected such that the pressing force exerted by the housing lid and the at least one spring element between the circuit and the housing floor is such as to maintain electrical contact between the circuit contact elements and the housing floor.

14. (Amended) The circuit housing of Claim 1, wherein the housing contact elements are at least partially spherical.

15. (Amended) The circuit housing of Claim 1, wherein the housing contact elements are constructed substantially as contact pins or flat contact surfaces.

16. (Amended) The circuit housing of Claim 1, wherein the housing floor is constructed as at least a section of a circuit board.

17. (Amended) The circuit housing of Claim 1, wherein the upper surface of the housing floor is provided with inner housing contact surfaces configured as flat elevations so as to make internal contact with the circuit contact elements.

18. (Amended) The circuit housing of Claim 17, wherein the inner housing contact surfaces comprise gold and are formed by the stamping of bumps.

Please add the following new Claims:

20. (New) The circuit housing of Claim 6, further comprising a rigid covering wherein the rigid covering shields the lid of the housing such that externally applied forces are inhibited from being transmitted to the circuit.

21. (New) An electronic circuit housing for an integrated circuit chip positioned therein, the chip having chip contacts, the housing comprising:

a housing floor comprising a plurality of outer contacts disposed on a lower surface of the housing floor so as to provide external contact and in electrical contact with a corresponding plurality of inner contacts arranged to correspond to the chip contacts; and

a housing lid adapted to be attached to the housing floor so as to define the housing wherein the attachment of the housing lid to the housing floor induces an elastic pressure on the chip so as to create a compression contact between the chip contacts and the inner contacts.

22. (New) The circuit housing of Claim 21, wherein the elastic pressure arises from an elastic deformation of the housing lid upon attachment of the housing lid and the housing floor with the chip interposed therebetween.

23. (New) The circuit housing of Claim 21, further comprising at least one elastic element interposed between the housing lid and the chip.

24. (New) The circuit housing of Claim 23, wherein the at least one elastic element comprises a spring.

25. (New) The circuit housing of Claim 23, wherein the at least one elastic element comprises an elastomeric bulk material.

26. (New) The circuit housing of Claim 23, wherein the at least one elastic element is fixedly attached to the housing lid or the chip.

27. (New) The circuit housing of Claim 23, wherein the at least one elastic element is held in compression between the housing lid and the chip by the attachment of the housing lid to the housing floor.

28. (New) The circuit housing of Claim 21, wherein at least one of the outer contacts and the chip contacts comprise gold.

REMARKS

These changes are being made to claim priority of a previously filed international application, to bring the application into better conformance with U.S. practice, and to further define what the Applicants regard as the invention. No new matter is being introduced. The entrance of this amendment is respectfully requested. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

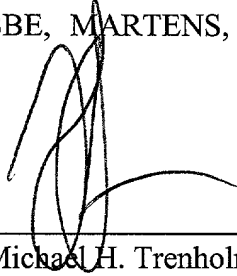
Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR,

LLP

Dated: 10/9/01

By: _____


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 1, immediately after the title "CIRCUIT HOUSING", please delete "DESCRIPTION" and insert—Related Applications This application claims the benefit of the application 01 115 832.6 filed in the European Patent Office June 28, 2001. Background of the Invention Field of the Invention--.

Page 1, line 11, please amend the sentence to read The invention relates to a miniaturized circuit housing [according to the precharacterizing clause of Claim 1] for encapsulating and providing external contacts for integrated circuits and, in particular, a housing with a housing floor and an oppositely disposed housing lid which presses a circuit contact element positioned therebetween resiliently against the upper surface of the housing floor.

Page 1, line 13, please insert —Description of the Related Art--.

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IN THE CLAIMS:

Please cancel Claim 19 without prejudice.

Please amend the Claims as follows:

1. (Amended) A miniaturized circuit housing to encapsulate and provide external contacts for at least one integrated circuit having circuit contact elements on a lower surface [, in particular of the flip-chip or wafer-level-package type, with] , the circuit housing comprising:

a housing floor[,] comprising [the] a lower surface [of] which [bears] includes housing contact elements for making external contact and [the] an upper surface [of] which is electrically connected to the circuit contact elements on the lower surface of the circuit[, characterized in that]; and

a housing lid [is provided, in particular] opposite the housing floor[, which presses] so as to press the circuit with the circuit contact elements resiliently against the upper surface of the housing floor with no permanent connection between the

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materials thereof [, and between the circuit contact elements and the housing floor there is no connection that fixes their materials permanently together].

2. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the housing lid on its lower surface, which faces the circuit, comprises at least one spring element that presses the circuit against the housing floor.

3. (Amended) The circuit housing [according to] of Claim 2, [characterized in that] wherein the at least one spring element [or elements] is[/are] fixedly attached to the lower surface of the housing lid.

4. (Amended) The circuit housing [according to] of Claim 2, [characterized in that] wherein the at least one spring element [or elements] is[/are] loosely inserted between the housing lid and circuit.

5. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the housing lid is [can itself act as a spring because of its] flexible [construction].

6. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] further comprising a wall that substantially rigidly connects the floor and the lid of the housing to one another at their circumference so as to define an interior of the housing and tightly seals off the interior of the housing.

7. (Amended) The circuit housing [according to] of Claim 6, [characterized in that] wherein the wall is formed as part[, particularly an integral part,] of the housing floor or the housing lid and wherein the wall is sealed via a butt joint to the respective [other housing component] housing lid or housing floor in a gas-tight manner.

8. (Amended) The circuit housing [according to] of Claim 7, [characterized in that] wherein the seal is formed by an external plastic encapsulation of at least the butt joint between the housing lid or housing floor and the wall.

9. (Amended) The circuit housing [according to] of Claim [1] 6, [characterized in that] wherein the interior of the housing is [being] filled with [a medium that is slow to react, in particular] an inert gas.

10. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the housing has a flat four-cornered shape, with a substantially level and rectangular housing floor and housing lid.

11. (Amended) The circuit housing [according to] of Claim [1] 6, [characterized in that] wherein the lid of the housing is rigidly constructed and joined to the

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wall [,or is shielded by a rigid covering, in such a way that externally applied force is not transmitted to the circuit].

12. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the lid of the housing is constructed as a heat sink comprising area-increasing structures in order to cool the circuit [, in particular bears cooling ribs or similar area-increasing structures].

13. (Amended) The circuit housing [according to] of Claim [1] 2, [characterized by a construction of the housing lid and/or the spring element or elements] wherein the ductility and shapes of the housing lid and the at least one spring element is selected such that the pressing force exerted by [these components] the housing lid and the at least one spring element between the circuit and the housing floor [is adjusted to suit the material of which the circuit contacts are made, in particular regarding their flow behavior and shape, in order to] is such as to maintain [a permanently good] electrical contact between the circuit contact elements and the housing floor.

14. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the housing contact elements [have substantially the shape of a sphere or a section of a sphere, like solder balls] are at least partially spherical.

15. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the housing contact elements are constructed substantially as contact pins or flat contact surfaces.

16. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the housing floor is constructed as at least a section of a circuit board [or a section thereof].

17. (Amended) The circuit housing [according to] of Claim 1, [characterized in that] wherein the upper surface of the housing floor [, to make internal contact with the circuit contact elements, there are] is provided with inner housing contact surfaces configured as flat elevations so as to make internal contact with the circuit contact elements.

18. (Amended) The circuit housing [according to] of Claim 17, [characterized in that] wherein the inner housing contact surfaces [are made substantially of] comprise gold [or a gold alloy and in particular] and are formed by the stamping of bumps.